A Brief Overview of Plant Communities and the Status of Selected Plant Species at John F. Kennedy Space Center, Florida

Prepared By

Paul A. Schmalzer, Ph.D.
Senior Field Ecologist

C. Ross Hinkle, Ph.D.
Senior Ecologist
Director, Environmental
Monitoring/Research Program

The Bionetics Corporation

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abs = (1) + (2) + (3) (over)

1.0 PLANT COMMUNITIES OF JOHN F. KENNEDY SPACE CENTER

1.1 Overview

(1)

John F. Kennedy Space Center (KSC) which contains within its boundaries Merritt Island National Wildlife Refuge and most of Canaveral National Seashore is located on the northern part of Merritt Island on the east coast of central Florida and consists of approximately 57,000 ha (140,000 ac) of land and lagoonal waters. Merritt Island and the adjacent Cape Canaveral form a barrier island complex. Topographic relief is slight; elevation ranges from sea level to about 3 m (10 ft) in the inland areas of Merritt Island and to slightly over 6 m (20 ft) on Cape Canaveral and the recent dunes. The topography is marked by a sequence of ridges and swales reflecting relict beach ridges. Cape Canaveral and, in earlier times, Merritt Island grew outward into the Atlantic Ocean. Successively older landscapes occur westward on Merritt Island and erosion has reduced its western side to a nearly level plain.

Surface deposits on Merritt Island are of Pleistocene and Recent ages consisting primarily of sand and sandy coquina. Differences in landscape position, drainage, and age have produced a wide variety of soils.

Merritt Island has a warm, humid climate. Annual precipitation is about 125 cm (49 in) and ranges from 4.01 cm (1.6 in) in December to 22.48 (8.9 in) in September. Mean daily maximum temperatures are 21°C (70°F) for January and 31°C (88°F) for July; mean daily minimum temperatures are 11°C (52°F) for January and 23°C (73°F) for July. Freezing temperatures may occur in the winter but do not generally persist. Thunderstorms are common in the summer months and lightning strikes from them are frequent. Wildfires are sometimes ignited by lightning.

(2)

Merritt Island contains a diverse flora; approximately 1067 species of native or introduced plants occur. This flora contains plants of northern (temperate) distribution some of which are near the southern limits of their range as well as species of subtropical and tropical distribution many of which are near the northern limits of their range. Introduced species occur around old homesites, past and present agricultural areas and areas affected by construction.

This diverse flora is arranged along the landscape in a complex series of plant communities. Distribution of the communities is influenced by major environmental factors including, soil type, presence of salt spray near the ocean, and elevation which influences the occurrence and duration of standing water. Wetland

types differ with the salinity of the water and soil. Fire is an important factor in many upland and marsh communities. Human activities have also modified or influenced the vegetation patterns.

Brief descriptions of the plant communities of KSC are given below. The classification used is that of the vegetation map of KSC at 1:12000 scale (The Bionetics Corporation, in preparation).

1.2 Upland Vegetation

Areas are considered uplands if they are not subject to flooding on a regular basis or have only brief periods of standing water. The transition from upland to wetland is often gradual so some arbitrary divisions are necessary. Major species are listed in Table 1.1.

1.2.1 Coastal-Salt Spray Zone

This area is adjacent to the Atlantic Ocean on recent dunes. Vegetation here is subject to the effects of wind-borne salt spray as well as sand movement from storms.

1.2.1.1 Coastal Dunes

This community occurs on the first dunes. It is dominated by sea oats (Uniola paniculata) with other grasses including slender cordgrass (Spartina patens) and beach grass (Panicum amarum) occurring. Small shrubs such as beach berry (Scaevola plumieri), marsh elder (Iva imbricata) and Croton punctatus occur along with herbs including beach sunflower (Helianthus debilis), railroad vine (Ipomoea pes-caprae), and camphorweed (Heterotheca subaxillaris).

1.2.1.2 Coastal Strand

Coastal strand occurs inland from the sea oats zone on more stabilized dunes. It is a dense shrub community dominated by saw palmetto (Serenoa repens) with other shrubs such as sea grape (Coccoloba uvifera), wax myrtle (Myrica cerifera), nakedwood (Myrcianthes fragrans), and snowberry (Chiococca alba) occurring. Inland, sand live oak (Quercus virginiana var. geminata) becomes more abundant.

1.2.2 Inland

All upland areas outside of the salt spray zone are included in this category.

Table 1.1. CHARACTERISTIC SPECIES OF MAJOR PLANT COMMUNITIES OF JOHN F. KENNEDY SPACE CENTER

UPLAND TYPES

	COASTAL		INLAND					
	Coastal Dune	Coastal Strand	Oak Scrub	Saw Palmetto Scrub	Slash Pine Flatwoods	Cabbage Palm Hammock	Oak–Cabbage Palm Hammock	Xeric Hammock
Trees								
Carya glabra								X
Juniperus silicicola							X	
Morus rubra							X	
Persea spp.							X	
Pinus elliottii					X			
Quercus chapmanii			X	X	X			
Q. laurifolia							X	
Q. myrtifolia			X	X	X			
Q. virginiana							X	X
Q. virginiana var. geminata		X	X	X	X			
Sabal palmetto						X	X	
Ulmus americana							X	
Shrubs and Woody Vines								
Chiococca alba		X						
Coccoloba uvifera	X	X						
Croton punctatus	X							
Ilex glabra					X			
I. vomitoria						X		
Iva imbricata	X							
Lyonia ferruginea			X		X			
L. fruticosa			X		X			

TABLE 1.1. CHARACTERISTIC SPECIES OF MAJOR PLANT COMMUNITIES OF JOHN F. KENNEDY SPACE CENTER
(continued)
UPLAND TYPES

	COASTAL		INLAND					
	Coastal Dune	Coastal Strand	Oak Scrub	Saw Palmetto Scrub	Slash Pine Flatwoods	Cabbage Palm Hammock	Oak-Cabbage Palm Hammock	Xeric Hammock
Lyonia lucida			X	X	X			
Myrcianthes fragrans		X					X	
Myrica cerifera		X						
Nectandra coriaceae							X	
Psychotria spp.							X	
Rapanea punctata		X					X	
Scaevola plumieri	X							
Serenoa repens		X	X	X	X	X		X
Smilax auriculata		X	X		X			
Vaccinium myrsinites			X		X			
Grasses and Graminoids								
Aristida spp.				X	X			
Panicum amarum	X							
Spartina patens	X							
Uniola paniculata	X							
Forbs								
Helianthus debilis	X							
Heterotheca subaxillaris	X							
Ipomoea pes-caprae	X							

1.2.2.1 Oak Scrub

The oak scrub community occurs on the best drained inland sites on old dune topography. It is a dense shrub community dominated by myrtle oak (Quercus myrtifolia), Chapman oak (Quercus chapmanii), sand live oak, and saw palmetto. Other common shrubs are rusty lyonia (Lyonia ferruginea), staggerbush, (Lyonia fruticosa), fetterbush (Lyonia lucida), and blueberry (Vaccinium myrsinites). A few areas of scrub have individuals of sand pine (Pinus clausa) present. On similar sites which are less well drained, saw palmetto becomes more dominant.

1.2.2.2 Saw Palmetto Scrub

The saw palmetto scrub community occurs on less well drained sites than the oak scrub type. Species composition is generally similar but saw palmetto has greater dominance and the oaks are less important in this type than in oak scrub. Although these types are classified separately, they have been mapped as a single unit because the differences in relative amounts of saw palmetto and oaks are not readily determined from aerial photography.

1.2.2.3 Slash Pine Flatwoods

The slash pine flatwoods community occurs on moderately to poorly drained sites on central Merritt Island. It has an open to sometimes dense canopy of slash pine (Pinus elliottii). The understory is dominated by myrtle oak, Chapman oak, sand live oak, saw palmetto, Lyonia spp., and wire grass (Aristida spp.) on the better drained sites. On wetter sites, saw palmetto has greater dominance and gallberry (Ilex glabra) also becomes more important. A few sites have an understory of Curtis's reedgrass (Calamovilfa curtissii).

1.2.2.4 Cabbage Palm Hammock

Hammocks are closed forests dominated by evergreen species. Several types occur on KSC. The cabbage palm hammock type typically occurs inland and at slightly greater elevation than cabbage palm savanna. It has a canopy of cabbage palm (Sabal palmetto). It may have an understory of saw palmetto or the understory may be open with scattered shrubs such as yaupon (Ilex vomitoria).

1.2.2.5 Oak-Cabbage Palm Hammock

The oak-cabbage palm hammock community has a canopy which is typically dominated by live oak (Quercus virginiana) of large size. Cabbage palm, laurel oak (Quercus laurifolia), elm (Ulmus americana), and red mulberry (Morus rubra) also occur in the

canopy. Shrubs of tropical affinity including nakedwood, lancewood (Nectandra coriaceae), myrsine (Rapanea punctata), and wild coffee (Psychotria spp.) dominate the understory. These hammocks occur at scattered locations on KSC often associated with soils underlain by coquina. In some areas near the lagoons, southern red cedar (Juniperus silicicola) becomes important in the hammocks.

1.2.2.6 Xeric Hammock

The xeric hammock community has a canopy of small to medium size live oaks and an understory of saw palmetto. In some areas, pignut hickory (Carya glabra) also occurs in the canopy.

1.3 Wetland Vegetation

Wetlands are those areas with permanent or seasonal high water tables which cause standing water to occur for part or all of the year. Wetlands are found in the central part of Merritt Island where they occur mainly in interdunal swales within scrub or slash pine flatwoods communities or along drainageways. Wetlands also occur on the edges of Merritt Island between the uplands and the lagoonal systems, Banana River, Banana Creek, Indian River, and Mosquito Lagoon. Most of this second type of wetland has been impounded and the water levels are managed to control mosquito populations. Major species are listed in Table 1.2.

1.3.1 Non-Saline Wetlands

Freshwater or non-saline wetlands occur primarily in the central part of Merritt Island in the interdunal swales and along drainageways.

1.3.1.1 Hardwood Swamp

The hardwood swamp community is a closed forest dominated by deciduous trees especially red maple (Acer rubrum) and elm, but often includes evergreen taxa such as laurel oak and cabbage palm. In the understory, royal fern (Osmunda regalis) and Virginia chain fern (Woodwardia virginica) occur.

1.3.1.2 Willow Swamp

The willow swamp community is a swamp of small trees dominated by Carolina willow (Salix caroliniana) with some red maple and wax myrtle. Aquatic plants such as duckweed (Lemna sp.) and arrowhead (Sagittaria stagnorum) occur. This community occurs in deeper water on sites with longer hydroperiods than the hardwood swamp community.

Table 1.2. CHARACTERISTIC SPECIES OF MAJOR PLANT COMMUNITIES OF JOHN F. KENNEDY SPACE CENTER

	WETLAND TYPES										
	NON-SALINE					BRACKISH OR SALINE					
	Hard-Wood Swamp	Willow Swamp	Cabbage Palm Savannah	Fresh-water Swale Marsh	Cat-tail Marsh	Sand Cordgrass-Black Rush Marsh	Mixed Salt-tolerant Grasses Marsh	Sea Oxeye	Saltwort-Glasswort	Saltmarsh Cordgrass Marsh	Mangrove Swamp
Trees											
Acer rubrum	X	X									
Persea spp.	X										
Q. laurifolia	X										
Sabal palmetto	X		X								
Salix caroliniana		X									
Ulmus americana	X										
Shrubs and Woody Vines											
Avicennia germinans											X
Baccharis halimifolia			X								
Batis maritima								X	X		X
Borrichia frutescens							X	X			
Conocarpus erecta											X
Languncularia racemosa											X
Lycium carolinianum								X			
Myrica cerifera		X	X			X					
Rhizophora mangle											X
Salicornia virginica									X	X	X
Grasses and Graminoids											
Andropogon spp.				X							
Cladium jamaicense				X							

TABLE 1.2. CHARACTERISTIC SPECIES OF MAJOR PLANT COMMUNITIES OF JOHN F. KENNEDY SPACE CENTER
(continued)
WETLAND TYPES

	NON-SALINE					BRACKISH OR SALINE					
	Hard-Wood Swamp	Willow Swamp	Cabbage Palm Savannah	Fresh-water Swale Marsh	Cat-tail Marsh	Sand Cordgrass-Black Rush Marsh	Mixed Salt-tolerant Grasses Marsh	Sea Oxeye	Saltwort-Glasswort	Saltmarsh Cordgrass Marsh	Mangrove Swamp
Distichlis spicata							X				
Erianthus giganteus			X								
Fimbristylis castanea			X								
Juncus roemerianus			X			X					
Panicum hemitomon				X							
Paspalum distichum							X				X
Spartina alterniflora									X	X	
S. bakeri			X	X		X					
Sporobolus virginicus							X				
Typha domingensis					X						
T. latifolia					X						
Forbs											
Acrostichum danaeifolium						X		X			
Bacopa spp.						X					
Blechnum serrulatum				X							
Lemna spp.		X			X						
Osmunda regalis	X										
Sagittaria lancifolia				X							
S. stagnorum		X									
Salicornia bigelowii									X		
Sesuvium portulacastrum							X		X		
Suaeda linearis											X
Urena lobata			X			X	X				
Urtricularia spp.		X			X						
Woodwardia virginica	X			X							

1.3.1.3 Freshwater Swale Marsh

Swales in scrub and slash pine flatwoods areas contain graminoid communities. These have been mapped as a single type but three major subtypes can be recognized on the ground. Shallow swales or the edges of larger ones are dominated by several species of beardgrass (Andropogon spp.). In areas with longer hydroperiods, sand cordgrass (Spartina bakeri) is dominant. Sawgrass (Cladium jamaicense) dominates areas with deeper water and longer hydroperiods. Other species occurring include Virginia chain fern, swamp fern (Blechnum serrulatum), Sagittaria lancifolia, and maidencane (Panicum hemitomon). With alterations in hydrology and/or long exclusion of fire, hardwood species such as willow, red maple, and wax myrtle may invade these areas.

1.3.1.4 Cattail Marsh

Cattail marsh is dominated by southern cattail (Typha domingensis) and common cattail (Typha latifolia) singly or in combination with each other. Other species occurring include duckweed and bladderwort (Urtricularia inflata, U. purpurea). Cattail marsh occurs in freshwater situations such as in borrow pits and swales and in some brackish water situations. Cattail has expanded greatly in parts of impoundments where higher water levels appear to favor it.

1.3.1.5 Cabbage Palm Savanna

The cabbage palm savanna community has an open or scattered canopy of cabbage palm and an understory of sand cordgrass with other graminoids such as black rush (Juncus roemerianus), Fimbristylis castanea, and giant plumegrass (Erianthus giganteus). Shrubs including wax myrtle and groundsel (Baccharis halimifolia) occur. Cabbage palm savanna occurs in two sites; these are certain swales and areas transitional between brackish marshes and upland communities.

1.3.2 Brackish or Saline Wetlands

Brackish or saline wetlands occur in marshes fringing Merritt Island adjacent to the lagoonal systems. Most of these areas have been impounded for mosquito control and their hydrology and salinity have been modified by this management. Saline soils and periodic inflow or pumping of lagoonal waters retain some salt marsh characteristics.

1.3.2.1 Sand Cordgrass-Black Rush

The sand cordgrass-black rush community is dominated by sand cordgrass and black rush; associated species include hyssop (Bacopa spp.) and leather fern (Acrostichum danaeifolium).

Scattered shrubs of wax myrtle and groundsel may occur. This type is generally the most inland of the brackish wetland vegetation and often grades into cabbage palm savanna.

1.3.2.2 Mixed Salt-tolerant Grasses Marsh

The mixed salt-tolerant grasses marsh is dominated by one or more species of short grasses including saltgrass (Distichlis spicata), seashore paspalum (Paspalum distichum), and seashore dropseed (Sporobolus virginicus) along with herbs including caesar-weed (Urena lobata) and sea purslane (Sesuvium portulacastrum). Patches of the shrub, sea oxeye (Borrichia frutescens), may occur.

1.3.2.3 Sea Oxeye

The sea oxeye community occurs interspersed with brackish or saline marsh vegetation and consists of dense stands of sea oxeye along with leather fern, christmasberry (Lycium carolinianum), and saltwort (Batis maritima). Each individual sea oxeye stand generally occupies a relatively small area.

1.3.2.4 Saltwort-Glasswort

The saltwort-glasswort community occurs associated with salt marsh vegetation and is dominated by the low shrubs saltwort and glasswort (Salicornia virginica). Annual glasswort (Salicornia bigelowii) and saltmarsh cordgrass (Spartina alterniflora) may also occur in this type.

1.3.2.5 Saltmarsh Cordgrass

The saltmarsh cordgrass type occurs in areas fringing saline or brackish lagoons where standing water frequently occurs. It is dominated by saltmarsh cordgrass with glasswort also occurring at some sites.

1.3.2.6 Mangrove

The mangrove community is dominated by black mangrove (Avicennia germinans), white mangrove (Languncularia racemosa), red mangrove (Rhizophora mangle), and buttonwood (Conocarpus erecta) singly or in combination. Other common species include saltwort, glasswort, seashore paspalum, and sea blite (Suaeda linearis). Two mangrove types have been mapped, black mangrove dominated by that species and mixed mangrove where white mangrove is also important. Mangrove communities fringe some areas of the lagoons and occur in some impounded wetlands.

1.4 Ruderal

Ruderal vegetation dominates sites disturbed by or created by past human activity such as construction and agriculture. Types may be dominated by introduced species or by native species which invade disturbed sites. Major species are listed in Table 1.3.

1.4.1 Brazilian Pepper

The brazilian pepper community occurs along dike roads, on spoil disposal sites, and in wetland areas modified by construction. Brazilian pepper (Schinus terebinthifolius) often forms nearly pure stands although some wax myrtle may also occur.

1.4.2 Australian Pine

The australian pine community occurs around active and abandoned citrus groves, old home sites, and roads where it was planted. Australian pine (Casuarina litorea) forms essentially pure stands and excludes most other plants.

1.4.3 Wax Myrtle

The wax myrtle community occurs along drainage canals, dike roads and in disturbed wetlands. Wax myrtle and groundsel are the most common shrub species.

1.4.4 Melaleuca

The melaleuca community occurs where melaleuca (Melaleuca quinquenervia) has been planted and in a few wetland sites where the species has invaded. Melaleuca tends to form pure stands.

1.4.5 Citrus Groves

Citrus groves are maintained by growers on Merritt Island and are the only agricultural community currently occurring within KSC. They are dominated by citrus trees (Citrus spp.) with associated grasses and weedy herbs. Abandoned citrus groves also occur.

Table 1.3. CHARACTERISTIC SPECIES OF MAJOR PLANT COMMUNITIES OF JOHN F. KENNEDY SPACE CENTER

RUDERAL TYPES

	Brazilian Pepper	Australian Pine	Wax Myrtle	Melaleuca	Citrus Groves
Shrubs and Woody Vines					
Baccharis halimifolia			X		
Myrica cerifera			X		
Introduced Plants					
Casuarina litorea		X			
Citrus spp.					X
Melaleuca quinquenervia				X	
Schinus terebinthifolius	X				

2.0 Endangered and Threatened Plants of John F. Kennedy Space Center

2.1 Overview

The recently updated list of endangered and threatened flora of Florida (Wood 1984) was compared to the floristic list of Merritt Island (Sweet 1976) and to a previous report on endangered, threatened, and rare plants of Merritt Island National Wildlife Refuge (Poppleton 1981) in order to develop a comprehensive listing of threatened and endangered plants. Two of the species listed may no longer be present on Merritt Island; Poppleton (1981) found no populations of Conradina grandiflora and reported that the one known population of Tournefortia gnaphalodes was eliminated by a freeze in 1977. Acrostichum aureum previously reported from KSC (Sweet 1976) was a mistaken identification (Poppleton 1981). Drosera intermedia listed in the Environmental Impact Statement (NASA 1979) does not occur here either (Poppleton 1981). Annona glabra (NASA 1979) is not included on current lists of endangered, threatened or rare plants.

Accompanying tables (Tables 2.1 and 2.2) summarize the designated status, habitat, population status and threats to the existence of endangered and threatened plants on KSC. Detailed information is available only for the species studied by Poppleton (1981) and those encountered in fieldwork related to long-term environmental monitoring and research at KSC (NASA 1982). Other species were identified during the floristic survey done for KSC by the University of Central Florida in the early 1970's (Sweet 1976). Current status of those populations is not known.

Endangered and threatened plants occur in various habitats including coastal dunes, coastal strand, scrub, pine flatwoods, hammocks, hardwood swamps, marshes, and mangrove swamps. It is evident that hammocks and hardwood swamps have a high concentration of threatened and endangered plants especially since hammocks and hardwood swamps make up a relatively small amount of the total vegetation of KSC.

The major threat to the continued existence of these endangered and threatened plants throughout their range is habitat destruction. Many hammock species, especially epiphytes, are sensitive to fire. Some scrub and pine flatwood species, on the other hand, decline if fire is long excluded from the community. Collection of horticulturally interesting plants such as orchids and Ophioglossum palmatum is a problem in some parts of the state and could occur on KSC outside of the security zone. Rooting by feral hogs could be a threat to terrestrial herbs, especially those of hammocks, but the extent of hog damage to these species is not known.

Table 2.1. Common Habitats of Endangered and Threatened Plants of John F. Kennedy Space Center

Scientific Name	Common Name	Designated Status[1]		Habitat
		USFWS[2]	FDA[3]	
Acrostichum danaeifolium[5]	Giant leather fern		T	Sand cordgrass-Black rush marsh, mangrove swamp
*Asclepias curtissii[4]	Curtiss milkweed		T	Oak scrub
Asimina pygmaea	Pink pawpaw or dwarf pawpaw		E	Slash pine flatwoods
Asplenium platyneuron	Ebony spleenwort		T	Hammocks
Azolla caroliniana[5]	Mosquito fern		T	Willow swamp, cattail marsh, drainage ditches
Calamovilfa curtissii[4,5]	Curtiss reedgrass	UR		Slash pine flatwoods
Calopogon tuberosus[5]	Grass pink (unnamed)		T	Hardwood swamp
Cereus eriophorus var. fragrans[4]	Fragrant wool-bearing cereus	UR	T	Coastal hammock (tropical)
Cereus gracilis	Prickly-apple	UR	E	Coastal hammock
*Chrysophyllum olivaeforme[4]	Satinleaf		T	Hammocks
Cocos nucifera	Coconut palm		T	Beaches and disturbed sites (introduced)
Conradina grandiflora	Large-flowered rosemary	UR		Scrub [probably extirpated][4]
Dryopteris ludoviciana	Florida shield fern		T	Hammocks
Encyclia tampensis	Butterfly orchid		T	Hammocks, hardwood swamps - epiphytic
Eulophia alta	Wild coco		T	Hardwood swamps, marshes and wet pine flatwoods
Habenaria odontopetala	Orchid (unnamed)		T	Hardwood swamps, hammocks and wet pine flatwoods
Habenaria repens	Water spider orchid or creeping orchid		T	Hardwood swamps and marshes

Table 2.1. Common Habitats of Endangered and Threatened Plants of John F. Kennedy Space Center (continued)

Scientific Name	Common Name	Designated Status[1]		Habitat
		USFWS[2]	FDA[3]	
Harrisella porrecta	Orchid (unnamed)		T	Hardwood swamps - epiphytic
Hexalectris spicata	Crested coralroot		T	Hammocks
Hymenocallis latifolia[4,5]	Broad-leaved spider lily	UR		Coastal dunes and strand
Ilex ambigua	Carolina holly or sand holly		T	Hammocks
Lechea cernua[4]	Nodding pinweed	UR		Scrub
Lycopodium alopecuroides	Foxtail club moss		T	Wet pine flatwoods and swamp edges
Lycopodium appressum	Southern club moss		T	Wet pine flatwoods
Lycopodium carolinianum	Slender club moss		T	Wet pine flatwoods
Malaxis spicata	Florida malaxis		T	Hardwood swamps, hammocks
Nephrolepis biserrata	Boston fern (unnamed)		T	Hardwood swamps, hammocks
*Ophioglossum palmatum[4]	Adder's tongue fern (unnamed)		E	Hammocks - epiphytic on cabbage palm
Ophioglossum petiolatum[5]	Adder's tongue fern (unnamed)		T	Edge of marshes
Opuntia compressa	Prickly pear cactus (unnamed)		T	Coastal dunes and strand
Opuntia stricta	Prickly pear cactus (unnamed)		T	Coastal dunes and strand
Osmunda cinnamomea[5]	Cinnamon fern		T	Hardwood swamps
Osmunda regalis var. spectabilis[5]	Royal fern		T	Hardwood swamps
Peperomia humilis	Pepper (unnamed)		T	Hammocks

Table 2.1. Common Habitats of Endangered and Threatened Plants of John F. Kennedy Space Center (continued)

Scientific Name	Common Name	Designated Status[1]		Habitat
		USFWS[2]	FDA[3]	
*Peperomia obtusifolia	Florida peperomia		T	Hammocks - epiphytic
Pereskia aculeata	Lemon vine		T	Shell middens
Persea borbonia var. humilis[4,5]	Dwarf redbay or redbay persea	UR		Scrub
Phlebodium aureum[5]	Golden polypody		T	Hammocks - epiphytic
Pogonia ophioglossoides	Rose pogonia		T	Marshes and wet pine flatwoods
Ponthieva racemosa	Shadow witch		T	Hammocks
Psilotum nudum[5]	Whisk fern or fork fern		T	Hammocks and hardwood swamps - epiphytic
Pteridium aquilinum[5]	Bracken fern		T	Pine flatwoods, scrub and disturbed sites
Rhynchosia cinerea[4]	Brown-haired snoutbean	UR		Scrub
Salvinia rotundifolia	Water spangles		T	Freshwater-ponds, ditches or marshes
Scaevola plumieri[5]	Scaevola		E	Coastal dunes and strand
Selaginella arenicola	Sand spikemoss		T	Scrub
Spiranthes laciniata	Lace-lip ladies'-tresses or lace-lip spiral orchid		T	Marshes
Suriana maritima	Bay cedar		E	Coastal dunes
Thelypteris interrupta	Aspidium fern (unnamed)		T	Hammocks
Thelypteris palustris	Marsh fern		T	Hardwood swamps and marshes
Thelypteris quadrangularis	Aspidium fern (unnamed)		T	Hammocks

Table 2.1. Common Habitats of Endangered and Threatened Plants of John F. Kennedy Space Center (continued)

Scientific Name	Common Name	Designated Status[1] USFWS[2]	FDA[3]	Habitat
Tillandsia simulata	Wild pine or air plant (unnamed)		T	Hammocks and hardwood swamps - epiphytic
*Tournefortia gnaphalodes	Sea lavender		E	Coastal dunes [probably extirpated][4]
Verbena maritima[4,5]	Coastal vervain	UR		Coastal dunes and strand
Verbena tampensis[4,5]	Tampa vervain	UR		Edge of hammocks
Vittaria lineata	Shoestring fern		T	Hammocks - epiphytic
Woodwardia aerolata	Netted chain fern		T	Hardwood swamps
Woodwardia virginica[5]	Virginia chain fern		T	Hardwood swamps
*Zamia umbrosa[4]	East coast coontie		T	Hammocks
Zeuxine strateumatica	Orchid (unnamed)		T	Open grassy areas [probably introduced]
	TOTAL	E-0 T-0 UR-10 NT-0 10	E-6 T-46 52	
		GRAND TOTAL 60		

Table 2.1. Common Habitats of Endangered and Threatened Plants of John F. Kennedy Space Center (continued)

[1]E=Endangered; NT=Non-valid Taxon (ineligible for federal listing); T=Threatened; UR=Under Review (for possible listing).
[2]United States Fish and Wildlife Service: List of Endangered and Threatened Wildlife and Plants, 50 CFR 17.12, 1982 (official United States list).
[3]Florida Department of Agriculture and Consumer Services: Preservation of Native Flora of Florida Act, Section 581.185, Florida Statutes (official State of Florida list).
[4]Sites and/or populations identified by Poppleton (1981)
[5]Sites and/or populations known from environmental monitoring/research program, The Bionetics Corporation, Contract No. NAS10-10285 with KSC Biomedical Office. (NASA 1982).
*Listed in Final Environmental Impact Statement (EIS) of KSC (NASA 1979).

Table 2.2 Population Status and Threats to Existence of Endangered and Threatened Plants of John F. Kennedy Space Center

Scientific Name	Common Name	Population Status	Threats to Existence
Acrostichum danaeifolium[2]	Giant leather fern	common within habitat	habitat destruction
*Asclepias curtissii[1]	Curtiss milkweed	one small population ca. 3 plants	habitat destruction fire exclusion
Asimina pygmaea	Pink pawpaw or dwarf pawpaw	unknown	habitat destruction
Asplenium platyneuron	Ebony spleenwort	one population known	habitat destruction
Azolla caroliniana[2]	Mosquito fern	common within habitat	habitat destruction
Calamovilfa curtissii[1,2]	Curtiss reedgrass	three populations known	habitat destruction
Calopogon tuberosus[2]	Grass pink (unnamed)	one population known	habitat destruction
Cereus eriophorus var. fragrans[1]	Fragrant wool-bearing cereus	one population known	collection
Cereus gracilis	Prickly-apple	unknown	collection, habitat destruction
*Chrysophyllum olivaeforme[1]	Satinleaf	one population known	habitat destruction
Cocos nucifera	Coconut palm	unknown	———
Conradina grandiflora	Large-flowered rosemary	probably extirpated[1]	habitat destruction
Dryopteris ludoviciana	Florida shield fern	one population known	habitat destruction
Encyclia tampensis	Butterfly orchid	unknown	habitat destruction fire
Eulophia alta	Wild coco	unknown	habitat destruction
Habenaria odontopetala	Orchid (unnamed)	unknown	habitat destruction
Habenaria repens	Water spider orchid or creeping orchid	unknown	habitat destruction

Table 2.2 Population Status and Threats to Existence of Endangered and Threatened Plants of John F. Kennedy Space Center (continued)

Scientific Name	Common Name	Population Status	Threats to Existence
Harrisella porrecta	Orchid (unnamed)	unknown	habitat destruction
Hexalectris spicata	Crested coralroot	unknown	fire habitat destruction
Hymenocallis latifolia[1],[2]	Broad-leaved spider lily	common within habitat	habitat destruction
Ilex ambigua	Carolina holly or sand holly	one population known	habitat destruction
Lechea cernua[1]	Nodding pinweed	one population known ca. 150-200 plants	habitat destruction, fire exclusion
Lycopodium alopecuroides	Foxtail club moss	unknown	habitat destruction
Lycopodium appressum	Southern club moss	unknown	habitat destruction
Lycopodium carolinianum	Slender club moss	unknown	habitat destruction
Malaxis spicata	Florida malaxis	unknown	habitat destruction
Nephrolepis biserrata	Boston fern (unnamed)	unknown	habitat destruction
*Ophioglossum palmatum[1]	Adder's tongue fern (unnamed)	three small populations ca. 30 plants	habitat destruction, collection, fire
Ophioglossum petiolatum[2]	Adder's tongue fern (unnamed)	one population known	habitat destruction
Opuntia compressa	Prickly pear cactus (unnamed)	common within habitat	habitat destruction
Opuntia stricta	Prickly pear cactus (unnamed)	common within habitat	habitat destruction
Osmunda cinnamomea[2]	Cinnamon fern	one population known	habitat destruction
Osmunda regalis var. spectabilis[2]	Royal fern	common within habitat	habitat destruction
Peperomia humilis	Pepper (unnamed)	unknown	habitat destruction

Table 2.2 Population Status and Threats to Existence of Endangered and Threatened Plants of John F. Kennedy Space Center (continued)

Scientific Name	Common Name	Population Status	Threats to Existence
*Peperomia obtusifolia	Florida peperomia	unknown	habitat destruction fire
Pereskia aculeata	Lemon vine	unknown	habitat destruction
Persea borbonia var. humilis[1,2]	Dwarf redbay or redbay persea	one population known ca. 40-50 plants	habitat destruction fire exclusion
Phlebodium aureum[2]	Golden polypody	frequent within habitat	habitat destruction fire
Pogonia ophioglossoides	Rose pogonia	unknown	habitat destruction
Ponthieva racemosa	Shadow witch	unknown	habitat destruction
Psilotum nudum[2]	Whisk fern or fork fern	one population known	habitat destruction fire
Pteridium aquilinum[2]	Bracken fern	common	none
Rhynchosia cinerea[1]	Brown-haired snoutbean	common within habitat	habitat destruction fire exclusion
Salvinia rotundifolia	Water spangles	unknown	habitat destruction
Scaevola plumieri[2]	Scaevola	common within habitat	habitat destruction
Selaginella arenicola	Sand spikemoss	unknown	habitat destruction
Spiranthes laciniata	Lace-lip ladies'-tresses or lace-lip spiral orchid	unknown	habitat destruction
Suriana maritima	Bay cedar	unknown	habitat destruction
Thelypteris interrupta	Aspidium fern (unnamed)	unknown	habitat destruction
Thelypteris palustris	Marsh fern	unknown	habitat destruction
Thelypteris quadrangularis	Aspidium fern (unnamed)	unknown	habitat destruction

Table 2.2 Population Status and Threats to Existence of Endangered and Threatened Plants of John F. Kennedy Space Center (continued)

Scientific Name	Common Name	Population Status	Threats to Existence
Tillandsia simulata	Wild pine or air plant (unnamed)	unknown	habitat destruction fire
*Tournefortia gnaphalodes	Sea lavender	probably extirpated[1]	———
Verbena maritima[1,2]	Coastal vervain	common within habitat	habitat destruction
Verbena tampensis[1,2]	Tampa vervain	two populations known ca. 10-15 plants	habitat destruction
Vittaria lineata	Shoestring fern	unknown	habitat destruction
Woodwardia aerolata	Netted chain fern	unknown	habitat destruction
Woodwardia virginica[2]	Virginia chain fern	common within habitat	habitat destruction
*Zamia umbrosa[1]	East coast coontie	ca. 100 plants	habitat destruction collection
Zeuxine strateumatica	Orchid (unnamed)	unknown	none

[1]Sites and/or populations identified by Poppleton (1981)
[2]Sites and/or populations known from environmental monitoring/research program, The Bionetics Corporation, Contract No. NAS10-10285 with KSC Biomedical Office (NASA 1982).

2.2 References on Endangered and Threatened Plants of John F. Kennedy Space Center

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